

MULTICRYSTAL LARGE APERTURE HARMONIC GENERATION

David Eimerl and David Milam
Lawrence Livermore National Laboratory, USA
and
Peter Milonni
Los Alamos National Laboratory, USA

We review recent developments in second and third harmonic harmonic generation of large aperture 1053 nm lasers. Lasers for inertial fusion studies as well as other applications require frequency doubling and tripling of pulses with potentially complex temporal pulse shapes, or bandwidth. The traditional method of frequency tripling, (which uses KDP or KD*P as the nonlinear material and a two crystal scheme - a doubler crystal followed by a mixer crystal), is limited to a dynamic range (in input 1053 nm intensity) of 2-3 and an output bandwidth of about 0.5 THz. However, multicrystal conversion schemes involving three or more crystals are capable of a dynamic range tripler that uses three crystals. We shall also discuss the problem of gravitational sag, which for large crystals can be large enough to impair the conversion efficiency significantly. Solutions to gravitational sag will be described.